1872MNRAS..32..272R

Occultations of Stars by the Moon, observed April 18, 1872, *at Maresfield.* By Capt. W. Noble.

Occultation of B.A.C. 3579 *by the Moon.*

The star disappeared instantaneously at the Moon's dark limb

$$\text{At } 9^{\text{h}}\ 48^{\text{m}}\ 37^{\text{s}}\!\cdot\!2 \text{ L.S.T.} = 7^{\text{h}}\ 59^{\text{m}}\ 40^{\text{s}}\!\cdot\!8 \text{ L.M.T.},$$

and reappeared at the bright limb

$$\text{At } 11^{\text{h}}\ 6^{\text{m}}\ 19^{\text{s}}\!\cdot\!5 \pm 1^{\text{s}} \text{ L.S.T.} = 9^{\text{h}}\ 17^{\text{m}}\ 10^{\text{s}}\!\cdot\!4 \text{ L.M.T.}$$

Afterwards I observed the

Occultation of i Leonis.

The star disappeared instantaneously at the dark limb

$$\text{At } 12^{\text{h}}\ 2^{\text{m}}\ 46^{\text{s}}\!\cdot\!0 \text{ L.S.T.} = 10^{\text{h}}\ 13^{\text{m}}\ 27^{\text{s}}\!\cdot\!6 \text{ L.M.T.}$$

Massive cumuli covered the Moon at the time of reappearance.

Power in each case 255, adjusted on the first-named star.

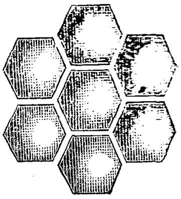
On the Value of the Stereoscope as applied to the Examination of Eclipse Photographs. By A. Cowper Ranyard, Esq.

At the last meeting of the Society it was suggested, that by combining in the stereoscope two photographic pictures of the corona, the one taken at the beginning of totality and the other towards the end, good and reliable evidence may be obtained that the corona is a solar appendage. It was further asserted, that in such a combination, if properly made, the dark body of the Moon and the corona both seem to stand out as solid bodies. If such stereoscopic appearances may be relied upon, their value in proving the solar nature of the corona, as well as in showing the way in which the streamers are arranged upon the solar surface cannot be too much exaggerated; for without them we are in possession of the mere projections upon a plane of an arrangement of details which curve and interlace with one another in three dimensions.

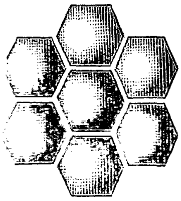
It becomes, therefore, of the greatest importance for us to examine whether, by such a combination, it is possible to obtain any true stereoscopic effect — by which I mean an effect which is produced by the parallax of nearer objects upon those further from the observer.

It is well known that suitable shading will influence our minds in that compound process often called the judgment of the eye; and the sloping together of lines in apparent perspective is continually used by artists whose business it is to make space of two dimensions appear as if it was space of three.

1872MNRAS..32..272R



The way in which we may be deceived by suitable shading is very well illustrated by the annexed drawing, which is made from a photograph taken a few years ago by Mr. Beck. The mere alteration of illumination caused by turning the drawing round will make the parts of the picture which in the one instance appear to be convex to appear as if they were concave.



It is also certain that our judgment is much less acute and discriminating when we view a picture through a lens than when it is looked at directly with the naked eye; for this purpose, single lenses are used to give apparent relief to photographic groups of flowers and other objects.

We cannot, therefore, be too careful in examining the real causes of any mental impressions that we may receive when looking at photographs through the medium of lenses, before we proceed to rely upon them as affording good proof of horizontal parallax between the two superposed pictures.

Let us now, therefore, examine what chance we have of finding such a difference caused by parallax in two corona photographs, taken, the one at the beginning and the other towards the end of totality. If there were four minutes of time between the pictures—which is, indeed, a longer period than has elapsed between any of the corona photographs that have yet been taken—the Moon in that time would have moved through about two minutes of arc, covering up on the one side and discovering on the other the solar prominences, as was clearly shown in 1860; and so far as the prominences are concerned we have a true effect of parallax, and reliable proof that the prominences are behind the Moon.

But when we come to the parts of the corona in which there is no covering and uncovering, our changes consist in the difference of distance from the Moon's limb of any details of the corona which may be detected upon a careful examination of the two photographs. By details I mean such clearly recognisable points or curve lines as exist *within* the corona—the outer boundary or contour of the coronal light depending evidently upon the amount of exposure or the different development of the two photographs.

Any such increase of distance from the Moon's limb on the one side, accompanied by a decrease of distance on the other side, may be regarded as sufficient proof that the shifting details are unconnected with the Moon, or, at all events, are not carried along with it in its motion; though it still remains for us to show from other considerations whether such details lie in front of, about, or behind the Moon. But as regards the nebulous and hazy portions of the corona we can have no such measurable and reliable proof, and we are left only to the natural inference of

1872MNRAS..32..272R

our minds that the nebulous haze is probably connected with the details which it surrounds.

It is, again, the inference of the mind which, upon looking into the stereoscope, associates those details of the corona which are not covered and uncovered by the Moon with those details which are so covered up and uncovered, or rather with the solar prominences, for there is very little detail of the corona proper to be seen at points so near to the Moon's limb.

If two similar photographs of the corona, copied from the same negative, be placed side by side in the stereoscope, the same effect of the Moon standing out in front of the corona is not produced.

We may therefore regard the stereoscope as a rough and ready means of detecting horizontal parallax between two photographs, though a much more satisfactory determination of the existence and amount of such parallax may be arrived at by a careful measurement of the photographs themselves.

Secondly, as to what may be learnt with regard to the disposition of the rays of the corona from any appearances of relief that may be detected with the stereoscope.

During four minutes of totality, our Earth would move through an angle, with respect to the Sun, of somewhat less than ten seconds of arc; while the Sun would turn upon his axis (carrying, we may conclude, all the detail of his coronal rays with him) through an angle of about two minutes of arc. This would leave a total alteration in the position that the arrangement of coronal rays would present to us of about one minute fifty seconds of arc, an angle too small to give appreciable relief in the stereoscope. That such an angle is far too small may be seen from the consideration that the maximum possible shift given by such a revolution to the end of a ray extending to the distance of the Sun's radius from the photosphere would not subtend an angle of one second, as viewed from the Earth, and the shift of such rays as are visible to us would be much less.

We must therefore reject all such appearances of solidity and relief amongst the rays of the corona as spurious effects produced by shading or some of the other unknown causes which are apt to deceive the mind.

On the other hand, the stereoscope is undoubtedly useful as affording a ready means of superposing, and thus showing the absolute identity as to form of the details of the corona at the beginning and end of totality.

The Tables of Jupiter's Satellites. By J. Maguire, Esq.

The proposal of the Astronomer Royal, published in the January Number of the *Monthly Notices*, viz., that one observatory should be permanently devoted to the observation of the phenomena of *Jupiter's* satellites, has undoubtedly a pre-